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ELECTROTECHNICAL VOCABULARY

PART XVI LIGHTING

Section 2 General Illumination, Lighting Fittings and Lighting for Traffic and Signalling

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Indian Standard
ELECTROTECHNICAL VOCABULARY
PART XVI LIGHTING
Section 2 General Illumination, Lighting Fittings and Lighting for Traffic and Signalling

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Indian Standard

ELECTROTECHNICAL VOCABULARY

PART XVI LIGHTING

Section 2 General Illumination, Lighting Fittings and Lighting for Traffic and Signalling

0. FOREWORD

0.1 This Indian Standard (Part XVI/Section 2) was adopted by the Indian Standards Institution on 16 January 1968, after the draft finalized by the Electrotechnical Standards Sectional Committee, in consultation with the Illuminating Engineering Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard (Part XVI/Section 2) is based, to a large extent, upon Publication No. 50(45) on 'International electrotechnical vocabulary' issued by the International Electrotechnical Commission. This section deals with general illumination, lighting fittings and their components and specialized lighting, such as air traffic lighting, street lighting, etc. Further sections of this standard covering terms relating to general aspects of lighting, lamps and auxiliaries are under preparation.

0.3 A compromise has been made between absolute precision and simplicity in order to arrive at the most apt definitions. The principal object of the terminology is to provide definitions which are sufficiently clear so that each term can be understood with the same meaning in the lighting field. Thus it may sometimes be felt that the definitions used in this standard are not sufficiently precise, do not include all cases, do not take account of certain exceptions or are not identical with those which may be found in other publications designed with other objects and for other readers. Such imperfections are inevitable and sometimes have to be accepted in the interest of simplicity and clarity.

0.4 The electrotechnical vocabulary is being prepared in several parts, each having one or more sections. A list of other parts so far published is given on P 25.

1. SCOPE

1.1 This standard (Part XVI/Section 2) covers definitions of the terms used in the field of lighting relating to the general illumination, lighting fittings and their components, and specialized lighting for traffic and signalling.

2. ILLUMINATION : GENERAL

2.1 Lighting — Illumination of objects and their surroundings so that they may be seen.

2.2 Lighting Technology — Combined techniques of lighting and related scientific principles.

2.3 Luminous Environment — Physiological and psychological environment created in a room by light (level and distribution of the illuminance, form and colour of the lighting) and colour (hue, saturation, distribution in the room, colour rendering) in association with the shape of the room.

2.4 General Lighting — Lighting designed to illuminate an area without provision for special local requirements.

2.5 Localized Lighting — Lighting designed to increase the illuminance at certain specified positions, for instance those at which work is carried on.

2.6 Direct Lighting — Lighting by means of fittings with a light distribution such that 90 to 100 percent of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.

2.7 Semi-direct Lighting — Lighting by means of fittings with a light distribution such that 60 to 90 percent of the emitted luminous flux reaches the working plane directly assuming that this plane is unbounded.

2.8 General Diffused Lighting — Lighting by means of fittings with a light distribution such that 40 to 60 percent of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.

2.9 Semi-indirect Lighting — Lighting by means of fittings with a light distribution such that only 10 to 40 percent of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.

2.10 Indirect Lighting — Lighting by means of fittings with a light distribution such that not more than 10 percent of the emitted luminous flux reaches the working plane directly, assuming that this plane is unbounded.

2.11 Directional Lighting — Lighting in which the light on the working plane or on an object is incident predominantly from a preferred direction.

2.12 Diffused Lighting — Lighting in which the light on the working plane or an object is not incident predominantly from any particular direction.

2.13 Permanent Supplementary Artificial Lighting in Interiors — Permanent artificial lighting intended to supplement the natural lighting of premises, when the natural lighting is insufficient or objectionable when used alone.

2.14 Floodlighting — Lighting by projectors of a scene or object in order to increase considerably the illuminance relative to the surroundings.

2.15 Lighting Console — Assembly of control and timing equipment for scenic lighting.

2.16 Extra Low Voltage Lighting — Lighting by means of incandescent lamps at a voltage not exceeding a fixed limit, generally 40 to 50 V.

2.17 Emergency Lighting — Minimum lighting intended to continue to carry out the work and to enable the occupants to have egress from a building with ease and certainty in the case of failure of the normal lighting system.

2.18 Standby Lighting — Lighting which enables work to continue in the case of failure of the normal lighting system.

2.19 (Luminous) Intensity Distribution Curve for a Lamp or Lighting Fitting — Curve, generally polar, which represents the luminous intensity in a plane passing through the source as a function of the angle measured from some given direction:

a) When the source has a symmetrical intensity distribution, the plane is generally a meridian plane.

b) When the reference direction is vertical, angles are measured from the downward vertical.

2.20 Surface of (Luminous) Intensity Distribution — Surface formed by the extremities of all the radius vectors drawn from a common origin, the length of each radius vector being proportional to the luminous intensity of the source in the corresponding direction.

2.21 Symmetrical (Luminous) Intensity Distribution — Distribution for which the surface of luminous intensity distribution can be generated by rotating a polar intensity distribution curve around an axis in the corresponding meridian plane.

2.22 Asymmetrical (Luminous) Intensity Distribution — Distribution for which the surface of luminous intensity distribution cannot be generated by the revolution of a polar intensity distribution curve about an axis of symmetry.

2.23 Upper (Lower) Hemispherical (Luminous) Flux of a Source — The luminous flux emitted above (below) a horizontal plane passing through the source.

NOTE — The plane should be specified in every case.

2.24 Rousseau Diagram — Graphical construction by means of which the luminous flux and the mean spherical luminous intensity of a (point) source with an axis of symmetry may be calculated from a knowledge of the luminous intensity in a certain number of directions in a meridian plane. The co-ordinates in one direction are proportional to luminous intensities, in the other direction to solid angles.

2.25 Russell — Series of angles defining coaxial zones of equal area on a sphere in such a way that the determination of total luminous flux from the intensity distribution curve is reduced to the calculation of the arithmetic mean of the intensities at these angles, the intensity at each angle being the average for that angle in the several meridian planes.

2.26 Isocandela Curve — Curve traced on an imaginary sphere with the source at its centre and joining all the points corresponding to those directions in which the luminous intensity is the same, or a plane projection of this curve.

2.27 Isocandela Diagram — Array of isocandela curves.

2.28 One-Half-Peak (One-Tenth Peak) Divergence — Angular extent of a beam which contains all the radius vectors of the polar curve of intensity having lengths greater than 50 percent (10 percent) of the maximum.

NOTE — In practice *beam spread* relates to the angle at which the illuminance on a plane normal to the axis of the beam is 10 percent of the maximum.

2.29 Isoluminance Curve — Locus of points on a surface at which the luminance is the same for given positions of the observer and of the source or sources in relation to the surface.

2.30 Isolux Curve — Locus of points on a surface where the illuminance has the same value.

2.31 Inter-Reflection — General effect of the reflections of radiation between several opposed reflecting surfaces.

2.32 Inter-Reflection Ratio — Ratio of the radiant or luminous flux ϕ_1 indirectly reaching a surface in a gravity to the primary flux ϕ_0 directly received by another surface, the flux ϕ_1 resulting from the inter-reflection undergone by the flux ϕ_0.

2.33 Reference Surface — Surface on which illuminance is measured or specified.

2.34 Working Plane — Reference surface defined as the plane at which work is usually done.

NOTE — In interior lighting and unless otherwise indicated, the plane is assumed to be a horizontal plane 0·85 m above the floor and limited by the walls of the room.

2.35 Utilized Flux — Luminous flux received on one side of the reference surface.

NOTE — Unless otherwise indicated the reference surface is the working plane.

2.36 Utilization Factor (Coefficient of Utilization) — Ratio of the utilized flux to the luminous flux emmitted by the lamps.

2.37 Room Index — Code number, representative of the geometry of a room, used in calculation of the utilization factor or the utilance.

Unless otherwise indicated, this index is given by the formula:

$$\frac{l \cdot b}{h\,(l+b)}$$

where

l = length of the room,
b = width, and
h = the distance of the lighting fittings above the working plane.

2.38 Utilance (U) — Ratio of the utilized flux to the luminous flux leaving the lighting fittings.

2.39 Optical Output Ratio of a Lighting Fitting — Ratio of the light output of the lighting fitting, measured under specified practical conditions, to the sum of the individual light outputs of the lamps when inside the fitting.

2.40 Light Output Ratio of a Lighting Fitting — Ratio of the light output of the lighting fitting, measured under specified practical conditions, to the sum of the individual light outputs of the lamps operating outside the fitting under specified conditions.

NOTE — For fittings using incandescent lamps, the optical output ratio and the light output ratio are the same in practice.

2.41 Uniformity Ratio of Illuminance on a Given Plane — Ratio of the minimum to the average illuminance on the plane.

NOTE — Use is made also of (a) the ratio of the minimum to the maximum illuminance, and (b) the inverse of either of these two ratios.

2.42 Magnification Ratio of a Lighting Fitting — Ratio of the maximum luminous intensity of the lighting fitting, generally a projector to the mean spherical luminous intensity of its lamp.

2.43 Maintenance Factor — Ratio of the average illuminance on the working plane after a certain period of use of a lighting installation to the average illuminance obtained under the same conditions for a new installation.

NOTE 1 — The concept of maintenance factor may also be applied to the illuminance at a given point on a given plane.

NOTE 2 — For artificial lighting, it is understood that a new installation is one in which the lamps have been aged as prescribed in IS : 418-1963* for incandescent lamps, IS : 2418-1964† for fluorescent lamps and IS : 2183-1963‡ for mercury vapour lamps.

2.44 Depreciation Factor — The reciprocal of the maintenance factor.

NOTE — The depreciation factor is always greater than 1.

2.45 Daylighting

2.45.1 *Sky Factor* — Ratio of that part of the daylight illuminance at a point on a given plane which would be received directly through unglazed openings from a sky of uniform luminance, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Direct sunlight is excluded for both values of illuminance.

NOTE — The sky factor is a pure geometrical ratio, and may be defined alternatively as follows:

> The sky factor at a point P on a given plane is $1/\pi$ of the area orthogonally projected on this plane from the surface intercepted on a sphere of unit radius with its centre at P by a cone having as its apex the point P and as its base the contour of that part of the sky visible from P.

2.45.2 *No-Sky Line* — Line which separates all of the points on the working plane at which the sky is directly visible from those at which no section of sky is directly visible.

2.45.3 *C.I.E. Standard Overcast Sky* — Completely overcast sky for which the ratio of its luminance at an altitude θ above the horizon to the luminance at the zenith is assumed to be

$$\frac{1 + 2 \sin \theta}{3}$$

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*Specification for tungsten filament general service electric lamps (*second revision*).

†Specification for tubular fluorescent lamps for general lighting service.

‡Schedule for high pressure mercury vapour lamps.

2.45.4 *Daylight Factor* — Ratio of the daylight illuminance at a point on a given plane due to the light received directly or indirectly from a sky of assumed or known luminance distribution, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Direct sunlight is excluded for both values of illuminance.

2.45.5 *Sky Component of Daylight Factor* — Ratio of that part of the daylight illuminance at a point on a given plane which is received directly from a sky of assumed or known luminance distribution, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Direct sunlight is excluded for both values of illuminance.

For a uniform sky and unglazed openings the sky component is identical with the sky factor.

2.45.6 *Externally Reflected Component of Daylight Factor* — Ratio of that part of the daylight illuminance at a point on a given plane which is received directly from external reflecting surfaces illuminated directly or indirectly by a sky of assumed or known luminance distribution, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Contributions of direct sunlight to the luminance of external reflecting surfaces and to the illuminance of the comparison plane are excluded.

2.45.7 *Internally Reflected Component of Daylight Factor* — Ratio of that part of the daylight illuminance at a point on a given plane which is received from internal reflecting surfaces, the sky being of assumed or known luminance distribution, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Contributions of direct sunlight to the luminances of internal reflecting surfaces and to the illuminance of the comparison plane are excluded.

3. LIGHTING FITTINGS AND THEIR COMPONENTS

3.1 Lighting Fitting (Luminaire) — Apparatus which distributes, filters or transforms the light given by a lamp or lamps and which includes all the items necessary for fixing and protecting these lamps and for connecting them to the supply circuit.

3.2 Symmetrical Lighting Fitting — Lighting fittings with a light distribution which is symmetrical (with reference to an axis, for example, or with one or more planes of symmetry).

Note — In earlier literature, the term 'symmetrical lighting fitting' is usually found only in the sense of a lighting fitting having an axially symmetrical distribution of the light.

3.3 Asymmetrical Lighting Fitting — Lighting fitting giving an asymmetrical light distribution.

3.3.1 *Non-axial Distribution* — An asymmetrical distribution in which the directions of peak intensity are not in vertical planes substantially parallel to the axis of the carriage way.

3.4 Narrow Angle Lighting Fitting — Lighting fitting which concentrates the light within a cone of comparatively small solid angle on the axis of the fitting.

3.5 Wide Angle Lighting Fitting — Lighting fitting which distributes the light over a comparatively wide solid angle.

3.6 Angle Lighting Fitting — Lighting fitting giving a light distribution which is asymmetrical with respect to a direction of special interest.

3.7 Flameproof Lighting Fitting — A flameproof lighting fitting is one that will withstand, when the fitting is properly assembled, and internal explosion of the flammable gas or vapour which may enter or which may originate inside the enclosure without suffering damage and without communicating the internal inflammation to the external flammable gas or vapour, through any joint or other opening in the fitting.

3.8 Dripproof Fitting — Fitting intended to withstand drops of water falling in a substantially vertical direction when the fitting is oriented as intended (for example, for use under a surface from which condensation may drip)

3.9 Rainproof Fitting — Fitting intended for use in a normal position out of doors (for example, a luminaire mounted on the exterior of a house).

3.10 Jet-Proof Fitting — Fitting intended to withstand a direct jet of water from any direction (for example, a fitting for non-immersed fountain illumination or use in a car washing bay).

3.11 Watertight Fitting — Lighting Fitting which shall withstand submersion to a depth of 5 cm at its highest point without water entering but not intended to be used permanently submerged in water

3.11.1 *Submersible Lighting Fitting* — Watertight lighting fitting so constructed that it will be capable of satisfactory operation when submerged under a specified head of water for an indefinite period.

3.12 Dustproof Lighting Fitting — Lighting fitting so constructed that dust of specified nature and fineness cannot enter in an amount sufficient to impair its satisfactory operation in a dust-laden atmosphere.

3.13 Dust-Tight Lighting Fitting — Lighting fitting so constructed that dust of specified nature and fineness cannot enter it when it is used in a dust-laden atmosphere.

3.14 Vapour-Tight Lighting Fitting — Lighting fitting so constructed that specified vapour or gas cannot enter its enclosure.

3.15 Wall Fitting: Wall Bracket — Lighting fitting to be fixed to a wall.

3.16 Ceiling Fitting — Lighting fitting to be fixed directly to a ceiling.

3.17 Pendant Fitting — Lighting fitting provided with a cord, chain, tube, etc, which enables it to be suspended from a ceiling or a wall support.

3.18 Rise and Fall Pendant — Pendant lighting fitting of which the height is adjustable by means of a suspension with pulleys, counterweights, etc.

3.19 Recessed Lighting Fitting — Lighting fitting mounted above the ceiling, or behind a wall or other surface.

3.20 Troffer — Long recessed lighting fitting usually installed with the opening flush with the ceiling.

3.21 Coffer — Recessed panel or dome in the ceiling.

3.22 Downlight — Small narrow angle lighting fitting, usually recessed in the ceiling.

3.22.1 *Bulkhead Fitting* — Plain lighting fitting of dimensions usually not exceeding 40 cm, intended to be fixed directly on a vertical or horizontal surface.

3.22.2 *Cornice Lighting* — Lighting system comprising light sources shielded by a panel parallel to the wall and attached to the ceiling and distributing light over the wall.

3.22.3 *Valance (Pelmet) Lighting* — Lighting system comprising light sources shielded by a panel parallel to the wall at the top of a window.

3.22.4 *Cove Lighting* — Lighting system comprising light sources shielded by a ledge or recess, and distributing light over the ceiling and upper wall.

3.22.5 *Luminous Ceiling* — Lighting installation comprising a substantially continuous surface of translucent (diffusing or directional) panels with lamps mounted above it.

3.22.6 *Floating Luminous Ceiling* — A luminous ceiling not covering the whole of the surface of the ceiling.

3.22.7 *Louvered (Louverall) Ceiling* — Lighting system comprising a wall-to-wall installation of multi-cell louvres above which are mounted the lamps.

3.23 Table Lamp — Portable lighting fitting with a short stand suitable for standing on furniture.

3.24 Standard (Pedestal) Lamp — Portable lighting fitting on a high stand suitable for standing on the floor.

3.25 Hand Lamp — Portable lighting fitting with a handle and connected by a flexible cord conductor to a current outlet or a self-contained battery-unit.

3.26 Pocket Lamp — Portable lighting fitting consisting of a container optics and a miniature lamp fed by a dry battery or accumulator.

NOTE — A *torch* is a pocket lamp with a cylindrical container.

3.27 Miner's Cap Lamp — A unit consisting of a battery, a head piece containing a lamp generally fixed to the front of the miner's helmet and the connecting cable, used for illuminating the path way ahead of a miner in an underground mine.

3.28 Decorative Chain — Set of decorative lamps arranged along a cable and connected in series or parallel.

3.29 Projector — Lighting fitting which, by means of mirrors or lenses, concentrates the light in a limited solid angle so as to obtain a high value of luminous intensity.

3.29.1 *Searchlight* — A projector having an aperture usually greater than 0·2 m and giving an approximately parallel beam of light.

3.29.2 *Spotlight* — A projector having an aperture usually smaller than 0·2 m and giving a concentrated beam of usually not more than 20° divergence.

3.30 Floodlight — Projector designed for floodlighting, usually with a beam spread of 10° to 160° usually capable of being pointed in any direction and of weather-proof construction.

3.31 Cut-Off — Technique used for concealing lamps and surfaces of high luminance from direct view in order to reduce glare.

NOTE — In public lighting, distinction may be made between *full-cut-off fittings*, *semi-cut-off fittings* and *non-cut-off fittings*.

3.32 Cut-Off Angle of a Lighting Fitting — Angle, measured up from nadir, between the vertical axis and the first line of sight at which the lamps and the surfaces of high luminance are not visible.

3.32.1 The *shielding angle* is the complementary angle of the cut-off angle.

3.33 Dimmer — Device enabling the luminous flux from lamps in a lighting installation to be varied in order to adjust the level of the illuminance.

3.34 Depolished Glass (Frosted or Ground Glass) — Glass, the surface of which has been depolished by mechanical (sand-blasting) or chemical (acid etching) treatment.

***3.35 Opal Glass** — Strongly diffusing glass, appearing white or milky. The diffusion takes place in the body of the glass.

***3.36 Opalescent Glass** — Incompletely diffusing opal glass with appreciable regular transmission and relatively high diffusion.

***3.37 Translucent Glass** — Incompletely diffusing glass, through which objects are not seen distinctly.

3.38 Flashed Glass — Glass composed of at least two different layers, generally one of transparent glass and one of opal, opalescent or coloured glass.

***3.39 Figured Glass** — Glass with a patterned or irregular surface.

3.40 Pressed Glass — Glassware formed by pressure between a mould and a plunger.

3.41 Prismatic Glass — Translucent rolled glass, one surface of which consists of parallel prisms made in three designs giving three different nominal angles of refraction to a beam of light passing through the glass.

3.42 Refractor — Device in which the phenomenon of refraction is used to alter the spatial distribution of the luminous flux from a source.

3.43 Reflector — Device used to alter the spatial distribution of the luminous flux from a source and depending essentially on the phenomenon of reflection.

3.44 Bowl — Diffuser, refractor or reflector in the form of a bowl, intended to be placed below the lamp.

3.45 Globe — Envelope of transparent or diffusing material, intended to protect the lamp, to diffuse the light, or to change the colour of the light.

3.46 Shade — Screen which may be made of opaque or diffusing materials and which is designed to prevent a lamp from being directly visible.

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*These terms can be applied to acrylic or equivalent materials.

3.47 Louvre: Spill Shield — Screen made of translucent or opaque components and geometrically disposed to prevent lamps from being directly visible over a given angle.

3.48 Spill Ring — Spill shield comprising elements in the form of annular rings placed concentrically.

3.49 Diffusing Screen — Screen of translucent material of large area covering the lamps in a lighting fitting in order to reduce the luminance by diffusion.

3.50 Protective Glass — Transparent or translucent part of an open or closed lighting fitting designed to protect the lamps from dust, dirt, or to prevent their contact with liquids, vapours or gases and to render them inaccessible.

3.51 Guard — Part of a lighting fitting in the form of a grille which renders the lamp inaccessible or protects it against mechanical damage. Alternatively, it retains fragments of the lamp or of the protective glass in case of breakage.

3.52 Projectors for Studios and Theatres

3.52.1 *Studio Floodlight* — Lantern with one-half-peak divergence exceeding 100° and with a cut-off not less than 180°.

3.52.2 *Special Studio Floodlight* — Lantern with a specified one-half-peak divergence (less than 100°) and a specified cut-off angle.

3.52.3 *Reflector Spotlight* — Lantern with simple reflector and capable of adjustment of divergence by relative movement of lamp and mirror.

3.52.4 *Lens Spotlight* — Lantern with simple lens, with or without reflector, and capable of adjustment of divergence by relative movement of lamp and lens.

3.52.5 *Fresnel Spotlight* — Lens spotlight with a stepped lens providing a soft edge to the beam.

3.52.6 *Profile Spotlight* — Lantern giving a hard edged beam which can be varied in outline by diaphragms, shutters or silhoutee cut-out masks.

3.52.7 *Effects Lanterns* — Lantern with optics designed to give oven field illumination of slides and well defined projection of detail using suitable objective lens. Slides can be of moving effects type or stationary.

3.52.8 *Softlight* — Lanterns of sufficient size to produce diffused lighting with indefinite shadow boundaries.

4. LIGHTING FOR TRAFFIC AND SIGNALLING

4.1 General Terms

4.1.1 *Light Signal* — Apparatus designed for exterior light signalling.

NOTE — Also used for the signal from the apparatus.

4.1.2 *Navigation Lights* — Light signals designed to assist navigation.

4.1.3 *Beacon*; *Lighthouse* — Assembly consisting of a light and its support and subsidiary structures, designed to give a light signal of a distinctive character to mark a geographical location in order to assist navigation.

4.1.4 *Character* (*Characteristic*) *of a Beacon or Light Signal* — The distinctive colour or periodic or both rhythm of a beacon or light signal enabling it to be identified.

4.1.5 *Fixed Light* — Light signal which appears continuous and steady to an observer whose position remains unchanged in relation to it.

4.1.6 *Rhythmic Light* — Light signal showing intermittently with a regular periodicity.

4.1.7 *Character Light*; *Code Light* — Intermittent light signal, rhythmic or non-rhythmic, showing characteristic groups of flashes by means of which it can be identified.

4.1.8 *Ground Light* — Light signal for indicating an obstruction, the boundary of an area, path or channel, a route to follow, etc.

4.1.9 *Flare* — Pyrotechnic device designed either to give a luminous signal (very light) or to illuminate a large area of ground (*parachute flare*).

NOTE — The term 'flare' is also used to denote a luminous flame produced from burning liquid fuel.

4.1.9.1 *Flarepot* — Light signal given by a flame from a combustible liquid.

4.1.9.2 *Indicator light* — Light signal giving information either by lighting or extinguishing.

4.1.9.3 *Warning signal* — Indicator light signalling abnormal operation without immediate danger.

4.1.9.4 *Danger signal* — Red indicator light signalling immediate danger.

4.1.9.5 *Repeater lamp* — Indicator light signalling normal operation.

4.2 Navigation

NOTE — For a more complete nomenclature on navigation lights (*see* the 'International Dictionary of Aids to Navigation').

4.2.1 *Isophase Light* — Rhythmic light for which the alternations of light and darkness are of equal duration.

4.2.2 *Flashing Light* — Light signal in which the total duration of light in each period is clearly shorter than the total duration of darkness and in which the flashes of light are all of equal duration.

4.2.3 *Occulting Light* — Light signal in which the total duration of light in each period in clearly longer than the total duration of darkness and in which the intervals of darkness (occultations) are all of equal duration.

4.2.4 *Quick Flashing Light* — Light signal showing regular or group of alternations of light and darkness which are repeated at intervals shorter than or equal to one second.

4.2.4.1 *Alternating light* — Rhythmic light showing light of alternating colours.

4.2.5 *Channel Light* — Light signal either on a fixed structure or on a buoy, marking the limit of a navigable channel.

4.2.6 *Landfall Light* — Light signal having a position luminous range and geographical range such that it can be identified at a great distance by an observer approaching the coast from the open sea. It is normally the first light to be seen in such a case.

4.3 Air-Traffic

4.3.1 *Aeronautical Ground Light* — Any light signal specially provided as an aid to air navigation, other than a light displayed on an aircraft.

4.3.2 *Channel Lights* — Aeronautical ground lights arranged along the sides of a channel or passage for aircraft.

4.3.3 *Taxi-Channel Lights* — Aeronautical ground lights arranged along a taxi-channel to indicate the route to be followed by taxying aircraft.

4.3.4 *Boundary Lights* — Aeronautical ground lights placed along the boundary of the land area of an aerodrome without runways, for use at night.

4.3.5 *Runway Lights* — Aeronautical ground lights arranged along the usable length of a runway.

NOTE — *Runway edge lights* and runway centre line lights mark the edges and the centre line of a runway respectively.

4.3.6 *Threshold Lights* — Aeronautical ground lights so placed as to indicate the longitudinal limits of that portion of a runway, or channel usable for landing.

4.3.7 *Taxiway Lights* — Aeronautical ground lights arranged along a taxiway to indicate the route to be followed by taxying aircraft.

NOTE — *Taxiway edge lights* and *taxiway centre line lights* mark the edges and the centre line of a taxiway respectively.

4.3.8 *Obstruction Lights* — Aeronautical ground lights provided to indicate obstructions.

4.3.9 *Approach Lights* — Aeronautical ground lights located in the approach area of a runway or channel and designed to give guidance to the pilot during the approach.

4.3.10 *Aeronautical Beacon* — Aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the earth.

4.3.11 *Aerodrome (Airport) Beacon* — Aeronautical beacon used to indicate the location of an aerodrome (airport).

4.3.12 *Hazard Beacon* — Aeronautical beacon used to designate a danger to air navigations.

4.3.13 *Identification Beacon* — Coded light signal by means of which a particular point of reference can be identified.

4.3.14 *Landing-Direction Indicator* — Device indicating visually the direction currently designated for landing and take-off

4.3.15 *Angle of Approach Indicator*; *Visual Approach Slope Indicator* — Aeronautical ground light or system of lights designed to indicate a desirable angle of descent during an approach to an aerodrome.

4.3.16 *Wind Indicator* — Device, luminous by night, designed to indicate the direction and, in some cases, the velocity of the surface wind.

4.3.17 *Aircraft Navigation Light* — Light signal used aboard an aircraft to indicate its position and aspect

4.3.18 *Landing Light* — Light signal used aboard an aircraft to illuminate the ground in front of the aircraft during landing.

4.3.19 *Signalling Lamp* — Device used for directing light signals at individual targets.

4.3.20 *Landing-Area Floodlight* — Floodlight designed for location at a landing field to illuminate all or part of the surface of the landing area.

4.3.21 *Blister Light* — Aeronautical ground light which protrudes above ground-level and can withstand being run over by an aircraft wheel without damage to itself or the aircraft.

4.3.22 *Circling Guidance Lights* — Aeronautical ground lights so arranged as to afford visual assistance to aircraft carrying out a circuit preparatory to an approach to land or during the approach.

4.3.23 *Cross Bar* — Line of aeronautical ground lights forming part of an approach light system being at right angles to, and symmetrically disposed about, the line of lights forming the centre line of the system.

4.3.24 *Elevated Light* — Aeronautical ground light in which the optical unit is raised completely above ground-level.

4.3.25 *Touchdown Zone Lights* — Runway surface lights installed as pairs of short transverse bars (barettes) between the runway: edge lights and the runway centre line lights to provide additional guidance for the aircraft during the touchdown phase on the runway.

4.3.26 *Runway Alignment Beacon* — Aeronautical beacon indicating a location in the approach to a particular runway at an aerodrome.

4.3.27 *Runway Surface Lights* — Blister lights so arranged as to assist the pilot of an aircraft to discern the runway surface and to maintain alignment with the runway.

4.3.28 *Wing-Bar* (*Inset Wing-Bar*) — Line of aeronautical ground lights extending laterally outwards (inwards) from the edge of a runway or its extension in the approach direction, at right angles to the direction of the runway or approach; wing-bars are normally provided symmetrically in opposite pairs on each side of the runway or approach.

4.3.29 *Blinking Light* — Rhythmic light in which the durations of light (of the order of one second) are shorter than the intervals of darkness.

4.3.30 *Anti-Collision Light* — Rhythmic light on an aircraft, of high luminous intensity and generally red, showing in all directions in azimuth.

4.3.31 *Taxying Light* — Projector on an aircraft for illuminating the ground in front of the aircraft while moving on the ground.

4.3.32 *Identification Light* — Light signal, generally coloured and coded, for signalling from air to air.

4.3.33 *Recognition Light* — Light signal, generally coloured and coded, for signalling from air to ground.

4.3.34 *Formation Light* — Light signal of limited coverage for signalling from air to air.

4.4 Street-Traffic

4.4.1 *Headlight* —Illuminating light of a vehicle intended to illuminate the road ahead.

4.4.2 *Meeting Beam (Dip Beam)* — A beam of light specially designed to ensure safety when vehicles meet. In the present state of technique, it is a beam illuminating only a specified limited part of road in order to reduce dazzle for an observer approaching ahead of the vehicle.

4.4.3 *Driving Beam* — A beam of light intended to illuminate the road over a great distance ahead of the vehicle.

4.4.4 *Direction Indicator* — A lighting device to show in which direction the driver intends to turn by giving a flashing light on the side of the vehicle towards which the turn will be made. The definition does not include:

a) the switchgear,
b) semaphore type indicators, and
c) additional indicators.

4.4.5 *Stop Light* — A break-operated lighting device which emits red light at the rear of the vehicle intended to give warning of the slowing down or the stopping of the vehicle.

4.4.6 *Sidelight* — A lighting device which emits light indicating the presence of a vehicle when seen from the front and in case of wide vehicles intended to show the width.

4.4.7 *Tail-Light* — A lighting device which emits red light indicating the presence of the vehicle when seen from the rear and in case of wide vehicles intended to show the width.

4.4.8 *Parking Light* — A lighting device showing a white (uncoloured light) to the front and a red light to the rear to give warning of the presence of the vehicle when parked.

4.4.9 *Fog Light* — A lighting device enabling the road to be effectively illuminated in fog, snow-fall, rain storms or dust clouds.

4.4.10 *Rear Number Plate Light* — A lighting device intended to illuminate the rear number plate.

4.4.11 *Reflex Reflector* — A device indicating the rear of a motor vehicle by reflection of the light emanating from a light source unconnected with that vehicle, the observer being positioned near the source.

4.4.12 *Traffic Signals* — Set of coloured lights used for regulating the flow of traffic. The standard colours are red, yellow (amber) and green.

4.4.13 (*Coloured*) *Flashing Light*; *Flashing Signal*; *Flashing Beacon* — Rhythmic coloured light signal used to stop the traffic (red light) or to slow down the traffic or to indicate the presence of a hazard (amber light).

4.4.14 *Pedestrian Crossing Light* — Signal carrying coloured inscriptions or symbols for regulating the passage by pedestrians of the crossings reserved for them.

4.4.15 *Illuminated Bollard Guard Post* — Luminous device mounted on a pedestal or at a short distance above the road surface and designed to separate or limit the directions of the flow of traffic.

***4.4.16** (......) Small light recessed in the carriageway to facilitate the flow of traffic.

4.5 Retro-Reflectors

4.5.1 *Retro-Reflecting Optical Unit* — Combination of optical elements producing retro-reflection.

4.5.2 *Retro-Reflector*; *Reflex Reflector* — Device, ready for use, comprising one or more retro-reflecting optical units.

4.5.3 *Effective Reflex Surface* — That part of the surface of a retro-reflector which is occupied by an assembly of retro-reflecting optical units and which appears continuous at the normal observations distances.

4.5.4 *Reference Axis* — Axis to be defined by the manufacturer of the retro-reflector, which serves as the reference direction for the entrance angles in photometric measurements and in practical use. This axis passes through the centroid of the effective reflex surface and usually coincides with the axis of symmetry, if any, of that surface.

4.5.5 *Reference Centre* — Intersection of the reference axis with the nearest plane to the observer which is perpendicular to this axis and which touches the effective reflex surface.

4.5.6 *Observation Angle* (α) — Angle between the straight lines joining the reference centre to the centre of the receptor and to the centre of the source of illumination.

4.5.7 *Entrance Angle* (β) — Angle between the reference axis and the straight line joining the reference centre to the centre of the source of illumination.

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*Correct term has been left open and will be added later.

NOTE — In standard practice for the photometry of retro-reflectors, the plane on which the observation angle is situated is vertical and the receptor is placed above the horizontal line which connects the centre of the source of illumination and the reference centre. The entrance angle is thus defined by two spherical co-ordinates about the references axis, vertical (*V*) and horizontal (*H*), analogous to latitude and longitude in a system where the equator is horizontal.

4.5.8 *Rotation Angle* (Σ) — Angle through which the retro-reflector may be rotated about its reference axis starting from one given position in order to fulfil the photometric tests.

4.5.9 *Illuminance at the Retro-Reflector* — Expression used canventionally to designate the illuminance produced by the source of light and measured in a plane perpendicular to the incident light and passing through the reference centre.

4.5.10 *Coefficient of (Reflex) Luminous Intensity* — Quotient of the luminous intensity reflected in the direction considered, divided by the illuminance at the retro-reflector for given angles of entrance, observation and rotation.

NOTE — In the photometry of retro-reflectors, this coefficient is designated by the abbreviation C. I. E. It is usually expressed in millicandelas per lux (m.cd lx^{-1}).

4.5.11 *Retro-Reflecting Material* — Material in which is incorporated a large number of very small elements which, by refraction and reflection, produce the phenomenon of retro-reflection when they become the surface as the material wears.

NOTE — The term retro-reflecting surface designates a particular type of retro-reflecting material where the small elements are only deposited on the surface.

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Shri T. K. Kundu (*Alternate*)	
Shri J. R. Nahar	The Premier Lighting Industries Private Ltd, Bombay
Shri Jayant R. Pari	Hindco Lighting Industries Ltd, Bombay
Shri S. S. Raghavan	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
Shri K. S. Sarma	National Physical Laboratory (CSIR), New Delhi
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INDIAN STANDARDS

ON

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1885 (Part II)-1961 Part II Machines and transformers
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